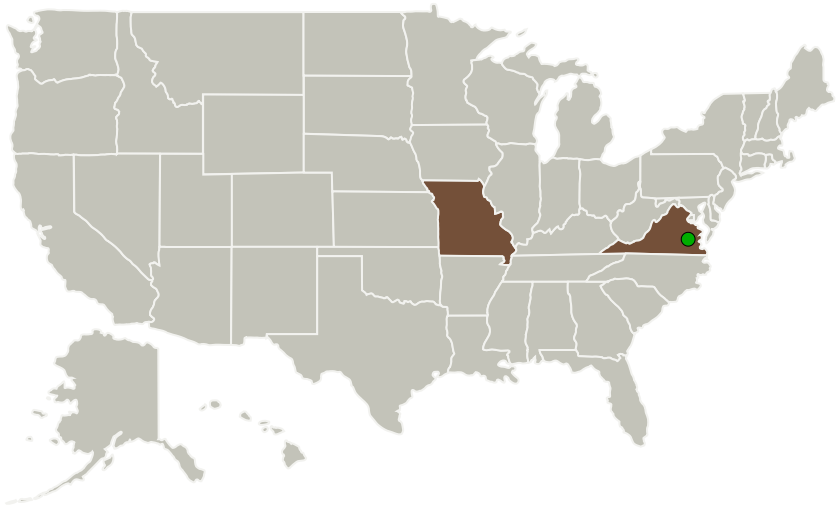
Lightweight High Efficiency Electric Motors and Actuators for Low Temperature Mobility and Robotics Applications, Phase II

Completed Technology Project (2011 - 2014)

Project Introduction

QM Power will build and empirically test Space and Cryogenic qualified preproduction Parallel Magnetic Circuit [PMC] 1-5 HP motor/actuators with electronic controllers. These preproduction prototypes will demonstrate lower operating power requirements for cryogenic motor/actuator components used in Space applications. PMC is an enabling technology having a broader peak power and high efficiency range than incumbent solutions for prime mover and dynamic suspensions used in space rovers and actuation in robotic systems. The PMC motors/actuators and electronic controllers to be built and empirically tested are those identified through the extensive modeling and analysis performed during the execution of QM Power's NASA Phase I contract NNX10CD85P demonstrating power densities greater than 0.050KW/lb with efficiencies greater than 90%. These PMC motor/actuator prototypes will undergo extensive testing in cryogenic and vacuum environments measuring performance, structural integrity, space radiation tolerance, and low out gassing. The prototypes will be optimized for manufacturing production under a Phase III effort for commercialization.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
QM Power, Inc.	Lead Organization	Industry	Boston, Massachusetts
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Missouri	Virginia

Project Transitions

June 2011: Project Start

June 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139032)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

QM Power, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

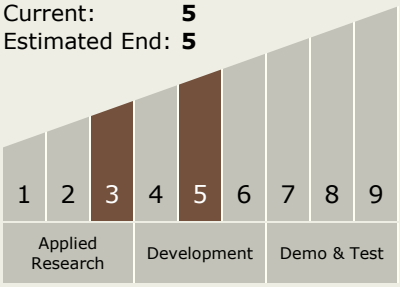
Carlos Torrez

Principal Investigator:

Charles R Flynn

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



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Completed Technology Project (2011 - 2014)

Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.3 Mechanical Systems
    - TX12.3.2 Electro-Mechanical, Mechanical, and Micromechanisms

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System